

mixing rotor, and the pair of longer blades include a first longer blade which is linear in a development of the mixing rotor developed into a plane about its longitudinal axis and extends from an edge of one longitudinal end of the mixing rotor toward the longitudinal middle side thereof by or beyond the longitudinal middle thereof, and a second longer blade which is substantially nonlinear in the development and extends from an edge of the other longitudinal end of the mixing rotor toward the longitudinal middle side thereof beyond the longitudinal middle thereof and whose helix angle gradually increases toward the other longitudinal end.

REMARKS

Favorable reconsideration of the present application is respectfully requested. Claims 1-20 remain active in the application, of which 4-10 and 14-20 have been allowed.

The specification and drawings have been amended to specifically refer to the edges 4A and 4B of the longitudinal ends of the rotor 4. Moreover, Claims 1 and 11 now recite that the longer blades extend from these edges. Support for this can be found in Fig. 2B.

Concerning paragraph 1 of the Office Action, the specification has been amended to change "leading end" to "trailing end." It is therefore respectfully requested that this objection be withdrawn.

Claims 1, 3, 11 and 13 were again rejected under 35 U.S.C. § 102 as being anticipated by the U.S. patent to Lohmann. However, the amended claims are believed to clearly define over this reference.

As previously discussed, according to a feature of the invention set forth in Claims 1 and 11, the pair of longer blades are twisted to cause the material to flow toward a longitudinal middle side of a developed view of the rotor, and include a first longer blade which is linear in the developed view. This first longer blade "extends from one edge of one longitudinal end of the mixer rotor toward the longitudinal middle side thereof." A second longer blade which is substantially nonlinear in the developed view "extends from one edge of the other longitudinal end of the mixing rotor toward the longitudinal middle side thereof" (page 9, lines 9-16).

In contrast, the nonlinear longer blade A of Lohmann and the linear blade B or C of Lohmann do not extend from an edge of one end and the other longitudinal end of the mixing rotor. Instead, the nonlinear longer blade extends from the left end (as seen in Figure 12 of Lohmann) whereas the linear longer blades B and C do not extend from either edge, but instead begin and end at a mid-portion of the rotor. The claims therefore clearly define over Lohmann.

It is noted that the amended claims respond to paragraph 9 of the Office Action. Claims 1 and 11 now recite that a portion of the blade is present at the end point of the rotor.

Concerning the rejection of Claims 2 and 12 under 35 U.S.C. § 103 as being obvious over either Lohmann in view of Nortey, it is noted that Nortey was cited to teach specific helix angles but provides no teaching for overcoming the shortcomings of Lohmann, as noted above. Applicants therefore respectfully submit that the amended claims define over any combination of the above references.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit and early notice of allowability.

Respectfully submitted,

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Marked-Up Copy
Serial No: 09/841,593
Amendment Filed on:
HEREWITH
04 / 22 / 03

IN THE SPECIFICATION

At page 9, lines 9-16, please delete the paragraph and substitute therefore.

--As shown in FIGS. 2A and 2B, in the mixing rotor 4 of this embodiment, the first longer blade 12 is a linear blade linearly extending from one longitudinal [end] edge 4A of the mixing rotor 4 toward the longitudinal middle side of the mixing rotor 4, whereas the second longer blades 13 is a nonlinear blade which extends from the other longitudinal [end] edge 4B of the mixing rotor 4 toward the longitudinal middle side of the mixing rotor 4 and whose helix angle gradually increases toward the other longitudinal end.--

At page 10, lines 4-15, please delete the paragraph and substitute therefore.

--Further, in this embodiment, the [leading] trailing end of the first longer blade 12 at the longitudinal middle side of the mixing rotor 4 is located at a position which is spaced apart from the second longer blade 13 by 120° or larger in the circumferential angle "c" of the mixing rotor 4, and the [leading] trailing end of the second longer blade 13 is located substantially in the middle between the [leading] trailing end of the first shorter blade 14 and the first longer blade 12 in the circumferential direction of the mixing rotor 4. In other words, the trailing end of the second longer blade 13 is set at such a circumferential position that circumferential angles "a" and "b" in FIG. 2B are substantially identical.--

At page 12, lines 10-23, please delete the paragraph and substitute therefore.

--Further, in the mixing rotor 4 of this embodiment, a sufficiently large space is provided before the second longer blade 13 with respect to the rotational direction of the mixing rotor 4 by locating the [leading] trailing end of the first longer blade 12 at a position circumferentially spaced apart from the second longer blade 13 by 120° or larger, and a sufficiently large space is provided before the first longer blade 12 with respect to the rotational direction of the mixing rotor 4 by locating the [leading] trailing end of the second longer blade 13 substantially in the middle between the leading end of the first shorter blade 14 and the second longer blade 12 in the circumferential direction of the mixing rotor 4. Therefore, the axial flow of material to be mixed becomes active, resulting in an improved mixing performance.--

IN THE CLAIMS

Please amend the claims as follows:

1. (Twice Amended) A mixing rotor for use in a batch mixer including a mixing chamber, the mixing rotor comprising a plurality of mixing blades, each mixing blade having a tip for defining a tip clearance against an inner surface of the mixing chamber where the mixing rotor is to be rotatably placed to impart shearing forces to a material to be mixed in the tip clearance, wherein the plurality of mixing blades include a pair of longer blades twisted in such a direction as to cause the material to flow toward a longitudinal middle side of the mixing rotor, and the pair of longer blades include a first longer blade which is linear in a development of the mixing rotor developed into a plane about its longitudinal axis and

extends from an edge of one longitudinal end of the mixing rotor toward the longitudinal middle side thereof by or beyond the longitudinal middle thereof, and a second longer blade which is substantially nonlinear in the development and extends from an edge of the other longitudinal end of the mixing rotor toward the longitudinal middle side thereof beyond the longitudinal middle thereof and whose helix angle gradually increases toward the other longitudinal end.

11. (Twice Amended) A batch mixer comprising:

a chamber including a mixing chamber; and

a mixing rotor rotatably placed in the mixing chamber, and including a plurality of mixing blades, each mixing blade having a tip for defining a tip clearance against an inner surface of the mixing chamber to impart shearing forces to a material to be mixed in the tip clearance, wherein the plurality of mixing blades include a pair of longer blades twisted in such a direction as to cause the material to flow toward a longitudinal middle side of the mixing rotor, and the pair of longer blades include a first longer blade which is linear in a development of the mixing rotor developed into a plane about its longitudinal axis and extends from an edge of one longitudinal end of the mixing rotor toward the longitudinal middle side thereof by or beyond the longitudinal middle thereof, and a second longer blade which is substantially nonlinear in the development and extends from an edge of the other longitudinal end of the mixing rotor toward the longitudinal middle side thereof beyond the longitudinal middle thereof and whose helix angle gradually increases toward the other longitudinal end.